



October 20, 2009

Supersedes October 18, 2005

CONCRETE PIPE & SPECIAL SECTIONS

Acceptance of concrete pipe and related precast units shall be on the basis of certification, plant approval (load-bearing tests), strength properties, absorption and permeability properties, material tests and inspection of manufactured pipe for visual defect and imperfections.

CONCRETE PIPE, SPECIAL PIPE SECTIONS & RELATED PRECAST UNITS

Concrete pipe and related precast units shall conform to the applicable requirements of AASHTO M86 (M86M), M170 (M170M), M198, M206 or M207 (M207M) for the class and size specified and the additional requirements as set forth in the Standard Road Plans (Design Standards) and in Section 4145 and other sections of the Standard Specifications of the Iowa Department of Transportation. Acceptance of standard strength 75D through 175D (1500D through 3750D) concrete pipe, special sections and related precast units will be on the basis of certification for each class and size from approved producers subject to periodic plant inspections and testing of monitor samples. Producers approved to furnish pipe, special sections and related precast units on the basis of certification are listed in [Appendix A](#) and [Appendix B](#) of IM 445.01. Monitor inspection and testing will be performed by the Iowa Department of Transportation.

The connectors near the top of the pipe sections and all other fasteners shall be coated using electroplating in accordance with ASTM B633, service condition SC4, required coating thickness of 0.5 mil. Classification and coating suffix FE / ZN 12. The connectors shall meet the requirements of ASTM A36 steel. All joints shall be watertight and shall be wrapped with engineering fabric, from an approved source listed in IM 496.01 Appendix A. Rubber gaskets for sealing the joints (when specified) shall meet the requirements of ASTM C443 or ASTM C443M.

Identification

In addition to the marking requirements of [Section 4145](#) of the Standard Specifications, a Quality Control Technician shall legibly mark the word "certified" on each unit. Each unit of pipe, including special sections so marked and stamped, identifies the pipe as being in compliance with the applicable AASHTO or ASTM Specifications, Standard Road Plans and the Iowa Department of Transportation Standard Specifications. **NOTE:** 18" pipe or smaller may be identified only on the outside surface. All other sizes shall be identified both on the outside and inside surfaces.

All pipes shall have the following markings: class, date manufactured, size, and trademark. Waterproof paint or ink shall be required. The District Materials Engineer shall approve any other methods.

WET CAST

- A. Air content (when concrete requires air entraining)-one test per week of production
- B. Concrete strength-6 cylinders per mix, per week
- C. Test at 7 days (3 cylinders) and at 28 days (3 cylinders)
- D. Compressive strength requirements:
 - 1. For Class I & Class II Reinforced Concrete Pipe
12-inch to 96-inch diameter, 4000 psi
102-inch to 144-inch diameter pipe, 5000 psi
 - 2. For Class III Reinforced Concrete Pipe
12-inch to 72-inch diameter pipe, 4000 psi
78-inch to 144-inch diameter pipe, 5000 psi
 - 3. Class IV Reinforced Concrete Pipe
12-inch to 144-inch diameter Pipe, 5000 psi
 - 4. Class V Reinforced Concrete Pipe
12-inch to 144-inch diameter pipe, 6000 psi
- E. Minimum strength requirements for all related precast units shall be as follows:
 - 28-day strength: 3500 psi
 - Shipping strength: 3500 psi
 - Moving Strength: 1500 psi

DRY CAST

Concrete Pipe Absorption Test - two tests per calendar year
Concrete Strength - ~~six~~ tests per calendar year

THREE-EDGE BEARING TEST

The minimum testing rate required shall be two pipes per size, per class, per year. The District Materials Engineer (DME) shall be notified prior to testing or a schedule may be mutually agreed upon.

All pipe and related precast items suitable for certification shall be stamped "certified" prior to or at the time of stockpiling. Certified pipe that no longer meets specifications (rejected) shall have the certification identification obliterated.

The producer shall afford the State of Iowa the opportunity for inspection, and notify the District Materials Engineer of the intended production schedule.

The producer shall test concrete pipes in accordance with the requirements of AASHTO T280 or ASTM C49 7. Tests results shall comply with the strength and absorption requirements contained herein. District Materials Engineers may observe and monitor the testing and determine the testing frequency. The producer shall supply a copy of all test results and a copy of the report of each annual inspection trip to the Office of Materials and the District Materials Engineer.

GENERAL REQUIREMENTS

- A. Winter concrete placement requires the approval of the DME, based on the following:
 - 1. Approved procedures for cold weather
 - 2. Applicable requirements of [Article 2403.03F](#)
 - 3. Plant approval (Local Batching and/or ready mix)
- B. Construction of reinforced gauges shall be in accordance with the requirements of [Article 4145.06C](#) of the Standard Specifications.
- C. Forms shall be smooth and true to shape and exact dimensions and maintained in good condition.
- D. Concrete shall be thoroughly consolidated by means of using external or internal vibrators.
- E. Lift holes may be allowed when requested by contractor.
 - 1. Maximum two lift holes per pipe
 - 2. Lift holes shall not be larger than 2½ inches in diameter
 - 3. The circumferential reinforcement of a single cage pipe shall not be cut at the lift hole locations
 - 4. The outer cage of a double cage reinforced pipe may be cut at the lift hole locations
 - 5. Circumferential reinforcement may be allowed (when practical) to be slightly bent to allow for the lift holes.
 - 6. A polyethylene, low-density plug may be allowed to be used to cover the lift holes prior to backfill.
 - a. The Iowa DOT has approved the following: Trade Name - Popit, Manufacturer's Name – Popit, Inc., Levittown, PA 19057.

REPAIRS

Pipes and related precast units may be repaired due to imperfections in manufacturing or minor damage during handling if the repaired pipe and related units are acceptable to the DME and if the repair conforms to the requirements of the specifications.

REJECTION

Pipes and related precast units shall be subject to rejection upon the following conditions:

- A. Pipes/units are not being inspected and/or certified
- B. Pipes/units fail to conform to any of the specification requirements
- C. Poor workmanship and imperfections